

SECTION III.—FORECASTS.

FORECASTS AND WARNINGS, SEPTEMBER, 1918.

By H. C. FRANKENFIELD, SUPERVISING FORECASTER.

[Dated: Washington, Oct. 7, 1918.]

GENERAL PRESSURE DISTRIBUTION OVER THE NORTHERN HEMISPHERE EXCEPT EUROPE AND INTERIOR ASIA.

Pressure over the southern portion of the North Pacific Ocean, as indicated by the observations at Honolulu, T. H., was nearly normal throughout the month, with a slight tendency toward subnormal conditions. Observations at Midway Island showed a somewhat more decided action, with moderately high pressure during the first and third decades of the month, except on the 29th and 30th, and with two well-defined depressions during the second decade. Over the North Pacific Ocean conditions were much more active and over a much wider field, embracing the whole of the northeastern Pacific Ocean and Alaska. Over this large area high pressure, not of exceptional character, prevailed during the greater portion of the first half of the month, with a single interruption on the 9th and 10th, while during the second half of the month, except during the last three days, low pressure ruled, with a great depression on the 17th and 18th (a few days earlier over the Aleutian Islands). However, conditions over extreme southern Alaska were not quite so pronounced as to the northward.

Ordinarily some of these decided pressure fluctuations over the North Pacific Ocean extend southeastward over the United States, in a somewhat lesser degree of course; but during this month there was a remarkable failure of such movement, and entire absence of strong cyclonic action throughout the United States proper, although there was a depression of considerable strength over the lower St. Lawrence Valley from the 27th to the 29th, inclusive. This depression, however, was a more or less composite one, the resultant, first, of a moderate cyclone from northwestern Ontario and a secondary one that developed off the Middle Atlantic coast during the 26th, and second, of a marked cyclone that moved in an east-southeast direction from the region north of latitude 55°. This second cyclone may have been the eastward manifestation of the one that prevailed over the Aleutian Islands and northern Alaska from the 21st to the 23d, inclusive, although it passed out of eastern Alaska with much diminished intensity. Its center was apparently some distance north of Alberta on the morning of the 25th, and by the morning of the 27th it had reached the southwestern portion of Hudson Bay, Port Nelson at that time reporting a barometer reading of 29.34 inches.

As a whole, pressure distribution was somewhat above normal over the United States during the month, except in the Atlantic States and along the Gulf of Mexico, where it ruled rather low, the conditions over the former district having been due mainly to a series of moderate secondary depressions of irregular definition and movement. Exceptions should be noted as follows: Over the Southwest and the Central West, moderately low pressure prevailed during the second decade of the month, and during the last few days. The low pres-

sure over Florida and the east Gulf of Mexico was the result of a tropical disturbance that did not progress north of Florida.

Over the central portion of the North Atlantic Ocean moderately high pressure prevailed throughout the month, except from the 4th to the 6th, inclusive, when it was low on account of a tropical disturbance that apparently passed northeastward a short distance west of the island of Bermuda during the day and night of the 4th, with a barometer reading at Hamilton, Bermuda, of 28.88 inches at 8 p. m. of the 4th. There were no evidences of this storm near the Atlantic coast other than an unusually high sea swell at Nantucket on the 5th and 6th, reaching its crest at 10 a. m. of the 6th.

Over the southern portion of the Atlantic Ocean pressure did not vary much from normal conditions.

Over the Caribbean Sea pressure was low during the first half of the month and nearly normal thereafter, except during the early days of the last week, when a disturbance was noted over the extreme western portion of the sea. It apparently recurved to the north-northeastward over eastern Yucatan and was finally lost over the northern portion of the Florida Peninsula. So far as reported, this storm was not severe except over portions of Pinellas County, Fla., and that portion of the Gulf of Mexico immediately adjacent, where several casualties were reported to have occurred.

Previous to this another disturbance of very moderate character, so far as is known, moved northwestward across the eastern Caribbean. It first came under observation at the island of Barbados on the evening of the 8th, apparently moved northwestward across the Caribbean, crossing Haiti during the 12th, inclined to a more northerly direction, and was last distinguished near Great Abaco Island on the morning of the 14th. This storm evidently dissipated between Bermuda and the south Atlantic coast, where pressure fell somewhat on the 14th.

Reports from Lisbon and the Azores Islands were resumed on September 1, 1918, and the latter showed moderately low pressure from the 1st to the 5th and the 13th to the 18th, all inclusive, and sustained and fairly well-marked high pressure thereafter.

STORM WARNINGS.

As a natural sequence of the absence of marked cyclonic disturbances, storm warnings during the month of September were neither numerous nor of wide application. Quite a number of warnings for moderate storms were displayed over limited areas on the Lakes and along the Atlantic Coast, and there were also a few local high winds of limited duration for which no warnings were ordered. The warnings displayed were justified either as a whole or in part, except in a few instances. The most marked failure attended the display of northeast warnings on the 28th from Georgia to Fort Monroe, Va. These were ordered on the assumption that the tropical disturbance, then over northern Florida, would continue northeastward with a probable increase in intensity. However, the storm dissipated over Florida and there were no strong winds on the Atlantic coast.

Advices regarding the three tropical disturbances of the month were issued, as usual, at frequent intervals to all interested parties.

FROST WARNINGS.

Frost warnings were issued on 21 days of the month, beginning with the 4th in upper Michigan. As a whole, extensive areas were not covered at any one time. Antecedent conditions were frequently more or less uncertain, and the subsequent occurrences were somewhat unsatisfactory at times from a forecasting viewpoint. Quite often the occurrence of frost was contingent upon clearing conditions that did not materialize as rapidly as had been expected, and in a few instances the clearing conditions approached more rapidly than had been anticipated, with resulting frosts that had not been forecast. However, there were no failures to forecast any extensive frost occurrences.

Chicago, Ill., Forecast District.—September was abnormally cool in nearly all parts of this forecast district and frosts were of frequent occurrence. Warnings were issued on 20 days during the month, although for limited areas in some instances. By the end of the second decade of the month killing frost or freezing temperature had occurred as far south as extreme northern Kansas and extreme northwestern Missouri and as far east as central Iowa and central Wisconsin. However, none had occurred in portions of Montana and Wyoming. The southern and eastern limits of killing frost by September 24 in an average year include only the territory north of the central portions of Wisconsin and Minnesota, northwestern Nebraska, and western and extreme northern South Dakota. The most important warnings were those issued on the 19th, 20th, and 26th. Most of the warnings were verified, although cloudiness prevented the formation of frost in some sections, especially in the upper Mississippi Valley and western Lake region during the night of the 19th-20th.

Warnings were sent to the cranberry bogs of Wisconsin on 16 days and no frost occurred without warning, except a light frost at Berlin on the 12th. There were two warnings which failed of verification on account of persistent cloudiness. The crop was nearly all harvested by October 1 with fair to good yields, and the entire failure of the crop was prevented only by flooding the bogs whenever heavy frost or freezing temperature was predicted.

On account of the unusually favorable weather conditions during the summer months tobacco matured much earlier than last year in the Wisconsin fields, and one-half to three-fourths of the crop was harvested by September 10 and nearly all by the 17th. No frost warnings were required in the Madison region and none was sent until the 19th. Warnings of frost were sent to the tobacco fields of western Wisconsin on the 9th and 15th. Heavy frost was predicted for the Chippewa Falls region for the night of the 9th-10th and the warning was fully verified, freezing temperature and killing frost occurring. The following reference to the warning was made in the University of Wisconsin Press Bulletin of the 26th:

TIMELY FROST WARNING SAVES TOBACCO CROP.

Tobacco growers in Chippewa County took advantage of the frost warnings sent out by the Weather Bureau early in the month and thereby saved their tobacco crops from damage.

All farmers with telephones were notified of the frost warning through the Weather Bureau at Chippewa Falls. They cut their tobacco and

piled it, so that it would be damaged only slightly. The next day, reports the weather observer, the piles were trimmed out and the tobacco allowed to wilt. In low places the piles had been covered with straw. As a result of the warning the tobacco is curing well.

Special forecasts for the benefit of the Free State Fair held at Topeka, Kans., were issued on the 9th and 11th. In regard to these forecasts, the official in charge at Topeka writes as follows:

I wish to thank you for your kindness in extending the daily forecasts this week for the benefit of the Free State Fair held at this place. This year this was probably the largest gathering of the nature ever occurring in Kansas, and the fact that it was possible to promise fair weather for several days in advance had no little part in contributing to its success. The special forecast of the 11th reading "Fair weather with seasonable temperatures next two or three days" was especially welcome, as its unequivocal promise made it possible for the fair management to plan events without fear of having them spoiled by unfavorable weather conditions, and it also encouraged persons living at a considerable distance to motor in to the event.—Chas. L. Mitchell.

New Orleans, La., Forecast District.—The weather during the month was free from storms and no storm warnings were issued.

Frost was forecast on the 16th, 20th, 26th, 27th, and 28th, for areas in the northern portion of the district. These warnings were mostly for light frost, or frost in low places, and were but partially justified. No severe or extensive frost damage occurred.

For the benefit of persons engaged in harvesting or other outdoor work, the forecast of fair weather, issued on the 7th, was extended 24 to 48 hours beyond the usual period and was fully verified.—R. A. Dyke.

Denver, Colo., Forecast District.—Weather conditions during September reflected the persistency of low-pressure areas in the district and the movement southward along the eastern slope of the majority of the high-pressure areas. Unsettled weather prevailed almost the entire month with frequent rains during the first half. While sharp changes in temperature were more common than usual and several decidedly cool spells occurred, practically no damage from frost occurred. The warnings were issued for the most part for local frost on the eastern slope based on the expected southward movement of high-pressure areas; on the 23d, 24th and 25th the warnings included areas west of the Continental Divide.—Frederick H. Brandenburg.

San Francisco, Cal., Forecast District.—Much unsettled weather prevailed in this district during September, especially in the Plateau region and California, where frequent, and in many places very heavy, rains occurred. In the western portions of both Washington and Oregon the precipitation was unusually light. In the Plateau region there were four distinct rainy periods—8th and 9th, 12th to 14th, 22d and 23d; and 29th to the end of the month, inclusive; and in California there were three rainy periods—11th to 14th, 21st and 22d, and from the 27th to the end of the month.

In portions of the Sacramento, the lower San Joaquin, Santa Clara, and Salinas valleys, and in the central section of the Sierra Nevada mountains and foothills the monthly amounts of rainfall exceeded all previous records for September, and the daily amounts at many stations were excessive. On the extreme northern California coast the rainfall was but slightly above the normal, but in most other sections of the State the amounts varied from 3 to over 20 times the usual monthly amount.

The rains came at the height of the prune and raisin-drying and tomato-canning season, and bean and walnut harvest; and in those sections where the rainfall was heavy, and preceded and followed by protracted damp

and cloudy weather, protection was impossible and great injury resulted. Fortunately, in the Fresno district there was but light rain, although much cloudiness, and most of the Thompson seedless raisins were uninjured; but the Muscats are still on the trays, and depend upon future weather. In the Orange County bean district the crop was practically secured before the rain came.

Ample warnings were issued in all instances and all warnings were justified and appreciated by the fruit growers.

There were numerous thunderstorms in California, which is unusual in September, and much damage was done by lightning to electric plants, oil wells, and some buildings.

Fire weather warnings were issued in Washington, Oregon, and Idaho, on the 11th and the 27th. Those on

the 11th read "Dry northeast winds and continued high temperatures to-day, to-night, and Thursday;" and on the 27th, "Moderate hot, dry north to northeast winds favorable for forest fires to-day, Saturday, and probably Sunday." These were timely, and regarding the latter the Oregon Forest Fire Association stated: "You will be interested to know that this forecast comes at what is considered a somewhat critical juncture, as we have fires scattered over practically the whole of northwestern Oregon, and definite knowledge that the present hot weather is going to continue will very materially affect our plans."

No storm warnings were issued and none were needed.

—G. H. Willson.